

Course guide

340692 - EMOB - Emobility

Last modified: 03/04/2024

Unit in charge:	Vilanova i la Geltrú School of Engineering
Teaching unit:	709 - DEE - Department of Electrical Engineering. 717 - DEGD - Department of Engineering Graphics and Design. 756 - THATC - Department of History and Theory of Architecture and Communication Techniques.
Degree:	BACHELOR'S DEGREE IN ELECTRICAL ENGINEERING (Syllabus 2009). (Optional subject). BACHELOR'S DEGREE IN INDUSTRIAL DESIGN AND PRODUCT DEVELOPMENT ENGINEERING (Syllabus 2009). (Optional subject). BACHELOR'S DEGREE IN INDUSTRIAL ELECTRONICS AND AUTOMATIC CONTROL ENGINEERING (Syllabus 2009). (Optional subject). BACHELOR'S DEGREE IN MECHANICAL ENGINEERING (Syllabus 2009). (Optional subject). BACHELOR'S DEGREE IN INFORMATICS ENGINEERING (Syllabus 2018). (Optional subject).

Academic year: 2024 **ECTS Credits:** 6.0 **Languages:** Catalan, Spanish, English

LECTURER

Coordinating lecturer:	Blanqué Molina, Balduino
Others:	Blanqué Molina, Balduino Arno Macia, Elisabet Aliau Pons, Juan José

REQUIREMENTS

Currently taking or having taken the courses corresponding to the 5th semester.

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:

- EMOB1. D55. Ability to analyze components and products.
- EMOB2. CE34. Ability to design electric systems and systems of traction in vehicles.
- EMOB3. CE19. Applied knowledge in electric engineering.
- EMOB4. CE24. Ability to design electronical, analog, digital and power systems.
- EMOB5. CE25. Knowledge and ability of systems modeling and simulation.
- EMOB6. D62. Practical ability to analyze form, composition and structure of products.
- EMOB7. D61. Practical knowledge of product detail design.
- EMOB8. D60. Practical knowledge of design and component and complex product development.
- EMOB9. D58. Practical knowledge of industrial design methodology.
- EMOB10. D57. Ability to redesign products.
- EMOB11. D53. Ability to associate possibilities to design in each fabrication process.

Transversal:

05 TEQ. TEAMWORK. Being able to work as a team player, either as a member or as a leader. Contributing to projects pragmatically and responsibly, by reaching commitments in accordance to the resources that are available.

06 URI. EFFECTIVE USE OF INFORMATION RESOURCES. Managing the acquisition, structure, analysis and display of information from the own field of specialization. Taking a critical stance with regard to the results obtained.

07 AAT. SELF-DIRECTED LEARNING. Detecting gaps in one's knowledge and overcoming them through critical self-appraisal. Choosing the best path for broadening one's knowledge.

CT3. TEAMWORK: Being able to work in an interdisciplinary team, whether as a member or as a leader, with the aim of contributing to projects pragmatically and responsibly and making commitments in view of the resources that are available.

04 COE. EFFICIENT ORAL AND WRITTEN COMMUNICATION. Communicating verbally and in writing about learning outcomes, thought-building and decision-making. Taking part in debates about issues related to the own field of specialization.

01 EIN N2. ENTREPRENEURSHIP AND INNOVATION - Level 2. Taking initiatives that give rise to opportunities and to new products and solutions, doing so with a vision of process implementation and market understanding, and involving others in projects that have to be carried out.

03 TLG. THIRD LANGUAGE. Learning a third language, preferably English, to a degree of oral and written fluency that fits in with the future needs of the graduates of each course.

TEACHING METHODOLOGY

The course will be taught through lectures and group activities, based on projects.

LEARNING OBJECTIVES OF THE SUBJECT

General

This course aims to provide students from different engineering fields with a sound foundation in electric mobility so that, through multidisciplinary teams, they can face the challenges that such systems will have to meet in the future. The course will be based on real examples of mobility and will focus on the competition teams of our school, EPSEVG.

Electrical systems applied to mobility

Students will be expected to understand how electric mobility systems work when applied to a real project, in which all the components of such systems are described and interrelated, considering the relevant disciplines: mechanics, electricity, electronics, programming, communications, design, etc.

Design and mechanical solutions

Analyse and design the mechanical components that are necessary for the shaping and functionality of the electric vehicle that is designed.

Project documents

Emphasis will be placed on the importance of technical communication in an international setting to present and promote innovative projects. Students will be presented with an overview of project-related documents and will work on the most important texts (including promotional texts to seek sponsors), as well as the persuasive oral presentation ("pitch"). Students will be provided with strategies for effective communication.

STUDY LOAD

Type	Hours	Percentage
Hours large group	45,0	30.00
Hours small group	15,0	10.00
Self study	90,0	60.00

Total learning time: 150 h

CONTENTS

Electrical systems applied to mobility

Description:

Topic 1: General description of an electric traction system for a wide range of applications.

Topic 2: Description of the most important parameters in the use and application of traction motors.

Topic 3: Description of the power sources used in electric mobility.

Topic 4: Description of auxiliary systems related to mobility.

Related competencies :

. CE24. Ability to design electronical, analog, digital and power systems.

. CE25. Knowledge and ability of systems modeling and simulation.

. CE34. Ability to design electric systems and systems of traction in vehicles.

. CE19. Applied knowledge in electric engineering.

. D55. Ability to analyze components and products.

07 AAT. SELF-DIRECTED LEARNING. Detecting gaps in one's knowledge and overcoming them through critical self-appraisal.

Choosing the best path for broadening one's knowledge.

05 TEQ. TEAMWORK. Being able to work as a team player, either as a member or as a leader. Contributing to projects pragmatically and responsibly, by reaching commitments in accordance to the resources that are available.

06 URI. EFFECTIVE USE OF INFORMATION RESOURCES. Managing the acquisition, structure, analysis and display of information from the own field of specialization. Taking a critical stance with regard to the results obtained.

Full-or-part-time: 75h

Theory classes: 22h 30m

Laboratory classes: 7h 30m

Self study : 45h

Design and mechanical solutions.

Description:

TOPIC 1: Design and geometry.

TOPIC 2: Analysis and calculation of load demands.

TOPIC 3: Battery refrigeration systems.

TOPIC 4: Manufacturing considerations.

Related competencies :

05 TEQ. TEAMWORK. Being able to work as a team player, either as a member or as a leader. Contributing to projects pragmatically and responsibly, by reaching commitments in accordance to the resources that are available.

Full-or-part-time: 45h

Theory classes: 13h 30m

Laboratory classes: 4h 30m

Self study : 27h

Project documents

Description:

1. Overview of the required project documents.
2. Principles of technical communication that can be applied to project documents.
3. Approaching the main project texts ("pitch", executive summary, specifications, feasibility and innovation reports, and promotional texts).
4. Practice in the planning and development of project documents.

Related competencies :

04 COE. EFFICIENT ORAL AND WRITTEN COMMUNICATION. Communicating verbally and in writing about learning outcomes, thought-building and decision-making. Taking part in debates about issues related to the own field of specialization.

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Full-or-part-time: 30h

Theory classes: 9h

Laboratory classes: 3h

Self study : 18h

GRADING SYSTEM

The course will consist of three main parts, with the following weights:

50% Electrical systems applied to mobility.

30% Design and mechanical solutions.

20% Project documents.

BIBLIOGRAPHY

Basic:

- Lannon, John M.; Gurak, Laura J. Technical communication [on line]. 15th ed. Harlow: Pearson Education Limited, 2021 [Consultation: 14/02/2024]. Available on: <https://ebookcentral-proquest-com.recursos.biblioteca.upc.edu/lib/upcatalunya-ebooks/detail.action?pq-origsite=primo&docID=6504034>. ISBN 9781292363646.

- Bombardó Solés, Carmen; Aguilar Pérez, Marta; Barahona Fuentes, Clàudia. Technical writing : a guide for effective communication [on line]. Barcelona: Edicions UPC, 2007 [Consultation: 02/05/2022]. Available on: <https://upcommons.upc.edu/handle/2099.3/36667>. ISBN 9788483019276.